REMARKS

The applicant respectfully requests reconsideration in view of the amendment and the following remarks. Support for amended claim 1 can be found in claim 3 and in the specification at page 3, last paragraph and in the examples. The applicant has cancelled claims 13-16.

Claims 13-16 are rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-3, 7-9, 12, 13, 15, & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori, US 7252876 ("Mori"), in view of Tsaptsis et al., US 7357836 ("Tsaptsis"). The applicant respectfully traverses these rejections.

The applicant appreciates that the Examiner has allowed claims 4-6.

Rejections under 35 U.S.C. 112

Claims 13-16 are rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicant has cancelled these claims. For the above reasons, this rejection should be withdrawn.

Rejections under 35 U.S.C. 103 (a)

Claims 1-3, 7-9, 12, 13, 15, & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 7252876 (Mori), in view of US 7357836 (Tsaptsis et al.).

Mori discloses laminated zeolite composite and method for production thereof (see the title). According to column 2, lines 29 to 36, in Mori laminated zeolite composite is disclosed characterized in that it comprises a MFI membrane constituted by a MFI type zeolite having a specific silica/alumina molar ratio and a porous substrate constituted by a further MFI type zeolite having another specific silica/alumina molar ratio, wherein the MFI membrane is formed on the porous MFI substrate. According to Mori, a MFI zeolite membrane is present on a MFI substrate, wherein both MFI zeolite types differ in SiO_2/Al_2O_3-molar ratio.

In Tsapatsis, crystalline membranes are disclosed (see the title) According to column 1, line 61, and following, the invention according to Tsapatsis teaches methods for forming crystalline membranes by inducing secondary growths in a layer of oriented seed crystals. According to column 3, lines 43 to 48, the porous substrate of Tsapatsis can include a metal oxide, e.g. α-alumina.

In contrast to the disclosures and teachings of Mori and Tsapatsis, in amended claim 1 of the present application a composite membrane is claimed consisting of a porous substrate and a porous separation layer present on said porous substrate, wherein the porous substrate is selected from the group consisting of steel, sintered metals, titanium oxide, titanium oxide on alumina, silica, zirconium dioxide and magnesium oxide. In addition, according to claim 1, the substrate contains less than 10% by weight of aluminum in elemental or chemical bound form in a zone of at least 100 nm adjacent to the separation layer.

Both features, on the one hand the material of which the porous substrate consists, and the other hand the fact that less than 10% by weight of aluminum in elemental or chemically bound form is present in a zone of at least 100 inn adjacent to the separation layer, is not disclosed and not suggested in Mori and Tsapatsis.

Mori disclose a substrate made of a MFI type zeolithe, comprising silica and alumina in a specific crystalline pattern (see col. 5, lines 15-18). With a porous substrate made of a MFI type zeolithe, aluminum atoms are essentially present in the substrate layer and are also present in a zone of at least 100 nm adjacent to the separation layer. Therefore, Mori cannot teach a composite membrane according to amended claim 1, having on the one hand a porous substrate being selected from the group consisting of steel, sintered metals, titanium oxide, titanium oxide on alumina, silica, zirconium dioxide and magnesium oxide. On the other hand, Mori cannot teach that a zone of a thickness of 100 nm which is neighbored to the separation layer, shall be essentially Al-free.

In addition, Tsapatsis disclose that the substrate of a composite comprising said substrate and a MFI-type zeolithe present on said substrate may be made of metal oxides, e.g. α-alumina. With a porous substrate made of α-alumina, the feature of claim 1 that in a zone of 100 nm adjacent to the substrate less than 10% by weight of Al-atoms shall be present cannot be

fulfilled. Tsapatsis does not suggest the very specific combination of features according to amended claim 1 of the present application.

A porous substrate which is selected from the group according to claim 1, containing less than 10% by weight of aluminum and elemental or chemically bound form in a zone of at least 100 nm adjacent to the separation layer gives rise to specific advantages which can be shown by the examples presented in the description of the present application.

According to the working examples on pages 13 to 16 of the description of the present application, membranes 1, 2, and 3 are prepared. The first membrane 1 according to claim 1 of the present application has a substrate made of titanium dioxide present on alumina. In membrane 2, which is not according to amended claim 1 of the present application, alumina is used a substrate, which is corresponding to Tsapatsis, and in membrane 3, titanium dioxide is used as a substrate. In order to show the advantages of the membranes according to amended claim 1 of the present application permeation experiments were conducted. The results are shown in the table on page 16 of the description of the present application.

Membrane 2 which is not according to the present application shows an amount of 1-butene in the permeate of 85.6%, 2-butenes in the permeate of 0.4%, and C_8-hydrocarbons in the permeate of 0.1%. In contrast to this comparative example, with membrane 3, having a substrate of titanium dioxide, 1-butene in the permeate can be obtained in an amount of 85%, whereas disturbing side products, being 2-butenes and (C_8-hydrocarbons are only present in amounts of <0.1%, and 17.5 ppb, respectively). Although the amount of 1-butene in the permeate is higher with membrane 2, the inventive membrane 2 according to amended claim 1 of the present application gives rise to a mixture comprising significantly lower amounts of 2-butenes and C_8-hydrocarbons, in the permeate, which is more advantageous.

With the examples of the description of the present application, it can be shown that a very specific composite membrane according to amended claim 1 of the present application gives rise to significantly improved membranes, which can be used in order to separate useful isomers of specific olefins from isomers of these olefins which are not wanted.

A statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the

references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See MPEP § 2143.01 IV. "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007) quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Furthermore, the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection. The mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention, obvious unless the prior art suggested the desirability of such modification. *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430 (Fed. Cir. 1990); *In re Fritch*, 23 USPQ2d 1780 (Fed. Cir. 1992). Thus, it is impermissible to simply engage in a hindsight reconstruction of the claimed invention where the reference itself provides no teaching as to why the applicant's combination would have been obvious. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991).

A person having ordinary skill in the art would not find a teaching in Mori and Tsapatsis that a porous layer made of the materials which are claimed in amended claim 1 shall be used. In addition, he or she would not find the teaching that in a zone 100 nm adjacent to the separation layer, less than 10% by weight of aluminum atoms shall be present.

Based on this, from the applicant's point of view, the composite membrane according to amended claim 1, the process for the preparation according to claim 4 and the process for separating olefin-containing mixtures according to claim 7 are non-obvious in light of Mori alone or in view of Tsapatsis. For the above reasons, this rejection should be withdrawn.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 13156-00063-US from which the undersigned is authorized to draw.

Dated: September 21, 2009

Respectfully submitted,

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